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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,647	01/06/2006	Jurgen Jean Louis Hoppenbrouwers	NL030796US1	3270

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EXAMINER

WILLIS, RANDAL L

ART UNIT

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2629

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/563,647

Applicant(s)

HOPPENBROUWERS ET AL.

Examiner

RANDAL WILLIS

Art Unit

2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/5508)
- Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This office action is in response to amendments in application 10/563647 filed February 12th 2009. Claims 1-18 are currently pending and have been examined.

Response to Arguments

2. Applicant's arguments filed February 12th 2009 have been fully considered but they are not persuasive. Applicant argues that Levac fails to teach changing the duty cycle based on the total luminance of the display, instead teaching of changing the duty cycle based on the number of energized LEDs. However, in Levac's device the LEDs are either displaying at optimal brightness, or are off. In such a system, counting the number of energized LEDs is the equivalent of counting the grayscales of the each pixel, with each grayscale being 1 for on and 0 for off, thus the number of energized LEDs is the total luminance of the display.
3. Further, applicant argues that the combination of Hanari and Itoh fail to disclose changing the duty cycle based upon the total luminance of the display. However, Itoh teaches changing the duty cycle based upon the average luminance of the display which is expressed as a percentage of the total luminance, thus an all white display would be 100% and an all black display would be 0%. The average luminance of the display would therefore directly relate to the total luminance of the display since the average is simply the total luminance divided by the number of pixels.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
4. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanari (7,123,220) in view of Itoh (7,053,881).

Apropos claims 1, 8 and 9, Hanari teaches:

Display device (Fig. 1) comprising a display panel (10, Fig. 1) having a plurality of display pixels (Fig. 3) with emissive display elements (16, Fig. 3); and

duty cycle control means (Switch control signal and transistor 19, Fig. 3) for varying a fraction of a frame period during which said display pixels emit light (Fig. 4 shows different fractions of emission periods)

However, Hanari fails to explicitly teach:

The duty cycle control means controlling in dependence on an total brightness level of an image to be displayed on said display panel.

In the same field of flat panel displays, Itoh teaches a method of improving the contrast by detecting the average brightness and peak brightness of the display (15 and 16, Fig. 1) and based upon that detection changing the amount of light emitted by the display (Backlight control portion 13, backlights are commonly controlled with a Pulse-width modulation scheme, Col 8 lines 54-65). The average brightness detected as a percentage of total luminance, which is dependant upon the total luminance of the frame Col 6 lines 49-60).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use the method of detecting the total brightness of the image and changing the luminance of the display as taught by Itoh in the display device of Hanari in order to improve the contrast of the display (Col 3 lines 60-65). Itoh's teaching of manipulation the backlight to change the luminance of the display does so without interfering with the gradation value of the pixels, and thus is easily adapted into the luminance duty cycle of Hanari which also doesn't effect the gradation value of the pixels so that the same effect can be achieved whether the pulse-width modulation is occurring in a backlight or on the pixels themselves.

Apropos claim 2, Itoh further teaches:

Display device according to claim 1, wherein said control means are adapted to increase said fraction if a decrease of said total brightness level is determined (Col 8 lines 54-65 and Col 16 lines 43-50).

Apropos claim 3, Itoh further teaches:

Display device according to claim 1 wherein said control means are adapted to decrease said fraction if an increase of said total brightness level is determined (Col 8 lines 54-65 and Col 16 lines 43-50).

Apropos claim 4, Hanari and Itoh fail to explicitly teach:

Display device according to claim 1, further comprising a frame memory for storing input signals, representing said image, during a frame period for enabling a determination of the total brightness level of the image during the frame period .

However, Examiner takes official notice that the use of frame memories in the signal processing of flat panel displays is well known in the art. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a frame memory to the display of Hanari and Itoh to allow the calculations of average brightness peak brightness and luminance control to be carried out during a previous frame's display time so as not to slow down the displaying of images.

Apropos claim 5, Hanari and Itoh fail to explicitly teach:

Display device according to claim 1, wherein the control means are adapted to determine the fraction of the frame period in dependence on the total brightness level of the image during a previous frame period.

However, Examiner takes official notice that the use of frame memories in the signal processing of flat panel displays is well known in the art. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a frame memory to the display of Hanari and Itoh to allow the calculations of average brightness peak brightness and luminance control to be carried out during a previous frame's display time so as not to slow down the displaying of images.

Apropos claim 6, Itoh teaches:

Display device according to claim 1, wherein the control means further comprise a look-up table (Fig. 3 shows screen brightness based upon total brightness, which in the combine device, the screen brightness figures would be controlled by the duty cycle) for determining said fraction corresponding with said determined total brightness level.

Apropos claim 7, Hanari teaches:

Display device according to claim 1, wherein said display pixels comprise a switch (19, Fig. 3) coupled to said control means (Switch control SC, Fig. 3) for enabling light emission by said corresponding emissive display element (Fig. 4) for said fraction of said frame period.

Claims 10-18 rejected under 35 U.S.C. 103(a) as being unpatentable over Hanari and Itoh in view of Nishitani (2009/0040157).

Apropos claim 10, 12, 13, 15, 16 and 18 Hanari and Itoh fail to explicitly teach:

The display device of claim 1, wherein the duty cycle control means include an adder configured to add brightness values of levels of the plurality of display pixels for the frame to form the total brightness level for the frame.

In the same field of display devices, Nishitani teaches a device that detects the average brightness level of the display through the use of an adder which adds up the greyscale values of the pixels of the display (See Fig. 4, Luminance average value detection section 201 includes adder circuit 38).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use the known luminance detection system as taught by Nishitani in the average luminance detector of Hanari and Itoh in order to achieve the predictable result of calculating the average luminance value of the frame to be displayed.

Apropos claims 11, 14 and 17 Nishitani further teaches::

Wherein the duty cycle control means include memory configured to store the total brightness level for the frame (Data hold latch 40, stores the luminance output).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 6, 8 and 9 rejected under 35 U.S.C. 102(b) as being anticipated by Levac (5,451,979).

Apropos claims 1, 8 and 9, Levac teaches:

Display device (10, Fig. 1) comprising a display panel having a plurality of display pixels (matrix of LEDs, abstract) with emissive display elements; and

duty cycle control means (21, Fig. 1) for varying a fraction of a frame period during which said display pixels emit light (Fig. 2a and 2b) in dependence on an total brightness level of an image to be displayed on said display panel (duty cycle determine by number of pixels that are illuminated, which is an total brightness).

Apropos claim 2, Levac teaches:

Display device (3) according to claim 1, wherein said control means (7) are adapted to increase said fraction if a decrease of said total brightness level is determined (See Fig. 4, while display is over 50% activated, the duty cycle increases as the number of energized LED's decrease).

Apropos claim 3, Levac further teaches:

Display device (3) according to claim 1 wherein said control means (7) are adapted to decrease said fraction if an increase of said total brightness level is determined (See Fig. 4, while display is over 50% activated, the duty cycle decreases as the number of energized LED's increase).

Apropos claim 4, Levac teaches:

Display device (3) according to claim 1, further comprising a frame memory for storing input signals, representing said image, during a frame period for enabling a determination of the total brightness level of the image during the frame period (Fig. 3 shows display counting number of pixels to be energized in step 52, before data is clocked into the display driver, therefore inherently has a memory).

Apropos claim 6, Levac teaches:

Display device (3) according to claim 1, wherein the control means (7) further comprise a look-up table (Duty cycle table 21, Fig. 1) for determining said fraction corresponding with said determined total brightness level.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RANDAL WILLIS whose telephone number is (571)270-1461. The examiner can normally be reached on Monday to Thursday, 8am to 5pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on 571-272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2629

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RLW

/Amr Awad/
Supervisory Patent Examiner, Art Unit 2629